The Art of Fusion—Sound & Design: An Interview with Eric Pritchard of Pritchard Amps

Pritchard Amps is making huge artistic impressions with its line of guitar and instrument amplifiers. These amplifiers offer a variety of boutique tones, practical versatility and attractive, retro, light, easy-to-carry packaging. The boutique quality tones boldly cover classic, jazz, blues, rock styles and more. The tones are easy to dial in, far simpler than modeling amplifiers. The versatility goes beyond a wide variety of tones to excellent level control. The Watts Knob™ truly adjusts the size of the amplifier so that screaming leads can be played comfortably in small rooms. And the Practice Jack provides tone compensated attenuation for practicing - a gift to domestic tranquility.

JI: How and when did you start Pritchard Amps?

EKP: Pritchard Amps metamorphosed from the PRS Harmonic Generator amplifier. Paul Reed Smith and I discussed the possibilities in '86 because in those days, tubes looked like they would disappear completely and a great transistor amplifier would take its place. So Paul supported the first couple designs. The second one was so bad that he dropped the project. I kept going, building the third and fourth amps and their variations without financial aid. Then Paul supported the fifth amp, nominally called the PRS Prototype. We built twenty. About half of them served as a mechanical basis for subsequent designs. Then Paul settled upon the sixth amp, the PRS Harmonic Generator. But this had the bad luck of being introduced at the 1991 Winter NAMM show, just when the bombing of Iraqi forces began. The fear of this third rate military power reduced sales generally. These new, controversial amps did not sell – not even one. Soon after that, I was back on my own, first as Deja Vu Audio and then as Pritchard Amps.

JI: How did you meet Paul and what did you do with him?

EKP: Around 1980, Paul and some other folks rented a house in Annapolis, MD. One of house mates was Rob Cherney, who happened to be the brother of one of my clients. Paul was helping Rob build an eight-string bass. Rob wanted a Bad Ass™ style bridge, but they were not available in eight strings. So Rob and Paul visited me. Paul liked the bridge and asked if I could handle some of his machining problems. One thing lead to another and I started helping him creating his dream, a guitar company called PRS Guitars, by designing and building the specialized guitar-making equipment and fixtures. His first desire was a "dupli-carver". I took the photo of this decidedly hobbyist machine and designed one for guitar geometry and heavy enough to make them quickly and accurately. I guess that machine helped built 50,000 guitars. Initially it did both bodies and necks, but after the 1986 trip to Japan to learn about neck carving and finding nothing, I designed the neck carver. Both of these machines were used until Paul bought computer-controlled milling machines. Then I designed most of the fixtures for those machines. The most recent project was a fret saw for his new 513 series guitars that precisely cut all of the fret slots in the fingerboard at one time in only a few seconds.

JI: What happened to those old machines?

EKP: The dupli-carver and the neck carver had a long rest in my shop until we started creating an amplifier factory. The dupli-carver was rebuilt, cleaned up and modified to do cabinet panels, i.e., trim the periphery, cut holes and groove joints. The neck carver makeover was far more extreme. It became an automated box joint saw. The remaining machines and fixtures are in storage, have been salvaged, or recycled.

JI: Our reviewers think Pritchard Amps are truly unique. Since you started in '86 or '87, you must have done a lot of research. What are your impressions and what were your worst problems?

EKP: Artistic amplifier design is an electronic enigma wrapped in a linguistic mystery. It is an enigma because engineering simply does not address artistic design considerations. The engineering paradigm is *to not be part of the art* and hence it demands reproductive accuracy and thence linearity. It demands linearity even though our ears are non-linear and consequently appreciate the artistic qualities such as warm, fat, full-bodied, resilient, life and multi-dimensional. Engineered amplifiers tend to be cold, thin, stiff, dead, and flat. The engineering paradigm seems to have come from modern philosophy. Not only did modern philosophy bring us the democratic ideals, "we hold these truths to be self-evident, all men are created equal", it mutated into the Behaviorist philosophy, which dominated from about 1910 to about 1970. Behaviorism would not be appreciated by your readers, since it claims that talent and ability do not exist. Further they put the mind, ideas, beliefs, desires, and feelings into a distant second class because they are all subjective and un-measurable, and thus, unfit for science. Unfortunately, electronics was formulated in the beginning of this era since Lee de Forest invented the triode in 1906 and the pentode was invented in 1926. The audio objective assumption is dominating in spite of definitive and contrary evidence produced by Fletcher and Manson in 1933 showing their famous nonlinear relationships of perceived hearing versus sound pressure levels. In spite of being reproduced in later years, the very subjective nature of their work prompted its ban from "objective science." The language was also a mystery, although not nearly as bad as it was initially. When Carlos Santana critiqued my first amplifier (circa summer of 1987) "like white wine" instead of "red wine", I had no clue. So he added that it was like glass, and not like flesh. Al DiMeola declared my third amp dead. Musicians and engineers are two peoples separated by a common language. Fortunately, Phil Zuckerman, a guitar player who was unhappy with all amplifiers of every technology, became interested in my efforts. We had to teach each other our languages otherwise we would have been two people "separated by a common language."

JI: What other sort of problems did you face in their development?

EKP: The third major issue is the accepted knowledge of musical amplifiers. The impressions and studies really lacked thoroughness and logical rigor. Tubes are supposed to be slower than transistors, but they were used in radar and FM radios. The difference between tubes and transistors is alleged to be that tubes make even harmonics while transistors make odd harmonics. But single-ended transistors, particularly junction field effect transistors, produce even harmonics and push-pull tubes produce odd harmonics predominately. Eventually, I made sense of these and many other issues.

JI: Was there a notable turning point in your research?

EKP: Oh, yes. It happened after I had created and proven a true tube emulator for 12AX7's. I had created a tube emulator version of a two-stage triode microphone amplifier, like the ones in LA-2A's. Then I tested it as prescribed by Russell Hamm in his famous paper, "Tubes Versus Transistors – Is There an Audible Difference?" Since, they had very similar harmonic structures, I thought I was nearly done. Well, I wasn't. I was stumped. So I checked my engineering education and experience for a rigorously logical connection to proven fact – something that I learned from studying mathematics. Beyond the basics, there was little but opinion and approximations. This was a real satori! Later, I connected the problem to the errant still living subjective-objective vestige of the long dead philosophy, Behaviorism. Unfortunately, it appears that this vestige has damaged many sciences.

JI: What drove your design issues?

EKP: Two demands drove the design issues, artistry and utility. Artistry of musical instrument amplifiers is not native to solid state as we have learned repeatedly. Consequently, special circuits had to be invented for virtually every artistic aspect. The full-body and the soft-clip of triodes require special circuits to make operational amplifiers measure proportionally to vacuum triodes. The artistry of the output stage was made far more complex to include utility issues like tone-invariant adjustable wattage and protections against over-temperature, voltage, and current. As I analyzed tube amps and translated an effect to solid state, I exaggerated its better natures to make sure that such a subtle thing would be heard readily. Then the effect was reduced to taste. Ultimately, this produce amplifiers with their own character and that inspired the name change from Deja Vu Audio to Pritchard Amps. The Voice Knob™ makes Pritchard amps quite useful. It gives the player a variety of basic tonal options for the amplifier. In addition to the inspiration of classic American and British amplifiers, there are tones that were developed because musicians needed them. The concept for the Voice Knob™ came from Phil's insistence upon a particular tone that required circuitry that was only in one vintage amplifier. After months of his insistence, I created the Voice Knob™ so that we both could be right. It did not take long to fill up the first one with a variety of tones to go from the airy art of acoustics to the liquid leads of rock with some classic amp tones in between. Then more tones including one for jazz standards. The utility of Pritchard amps is further enhanced by a variety of features. The Watts Knob™ adjusts the output power of the amplifier without changing the tone. This helps the rock and blues players play screaming leads in small rooms at more comfortable levels and also meet recently imposed audio level restrictions. There is also the Practice Jack™ for the speaker - it engages a tone compensated attenuator to reduce the amp's output to acoustic levels - my gift to domestic tranquility. Plus, there is a fully loaded rear panel with, effects loops, equalized and straight directs, and foot switch control.

JI: Your cabinets have a big sound for such a small size. How did that happen?

EKP: Initially, I used standard open or closed back cabinets, but building a prototype bass amp demanded a new cabinet. Since small closed back cabinets with smooth bass are not compatible with the artistic amplifiers, I looked into transmission line cabinets and their completely different design principles. While great for bass, they did not work with guitar speakers. Eventually, we solved the problems and truly great cabinets became part of the line. Of course, we do have a closed back cabinet too because that sound is part of the rock phenomenon.

JI: Since you started designing amplifiers in 1987 and had all these problems. How many prototypes did you build?

EKP: We built over 60. The only way that I could communicate my concepts was, and still is, to build it and then to have it critiqued by musicians. The development of Pritchard amps required many iterations of designing, building, critiquing, and theorizing. Phil provided a wonderful and needed continuity in the critiques. Most musicians would not critique amps more than once. It was also difficult to find musicians who had great ears and musical judgment. Phil has great hearing and musical judgment.

JI: Your amplifiers sound quite universal. Do you agree, and if so, why?

EKP: Pritchard amps are quite universal for two reasons. First, the amplifier has great harmonic structures that flow from fat clean tones through expressive edge tones, and into liquid leads. Second, the Voice Knobs let the player pick a basic tone that suits his style. Between these two rather unique features, Pritchard amps break the mold of being a single-use or typed amplifier.

JI: What class is your output stage?

EKP: The output stage is Class AB and it exaggerates vintage Class AB output stages because those stages have a unique and unrecognized harmonic structure. The odd harmonics created prior to clipping are expansive while the clipping odd harmonics are compressive. Exaggerating the expansive harmonics gives the amp more touch response, greater expression, and extends the transition in to distortion. This is why I believe that true Class A amplifiers are not in the musician's best interest. They are clean in an engineer's sense and that generally translates to a musician's thin. On the other hand, there are amplifiers that carry a Class A claim that are really not. True Class A minimizes output stage harmonic distortion, sag, and compression - all those things that musicians generally desire.

JI: When did you get interested in electronics?

EKP: When I was twelve, I put together a portable radio kit, a Knight Kit. It had a battery for filaments and another battery for the plates. Later, I built Heathkits and worked as an electronics technician. I got my engineering degree 1968 after graduating with a mathematics degree in 1963. If that does not date this experience adequately, when I started engineering, they taught tubes. Before I graduated, they were teaching transistors. Curiously, they were taught in nearly the same way in spite of the substantial differences.

JI: What did you do before Pritchard Amps?

EKP: While I was in graduate school and up to 1981, I worked for the Navy as an electrical engineer predominately with circuits in a nuclear environment. This required intimate knowledge of devices because we had to create accurate computer models of devices and circuits, even when being irradiated. This was done because testing in the strategic environment presents an

impractical test environment plus it would have violated international treaties. After 1981, I helped Paul Reed Smith create PRS Guitars, created computer-controlled camera systems, and all sorts of custom equipment for a variety of manufacturers.

JI: What do you think of the tubes versus transistors debate?

EKP: Several things. The similarity in engineering instruction gave engineers the idea that they were loosely equivalent. Certainly, prior to clipping, they do behave quite similarly, particularly with lots of feedback. But many musicians and some audio engineers do violate the engineering headroom paradigm and drive the amplifiers into clipping. Clipping is a wholly different experience for amplifiers. While the bias of tubes is about the signal level, the bias of transistors is routinely many times is much larger so clipping behavior is much different. Consequently, the issue is not simple. It is not merely "tubes versus transistors". It is tubes and tube circuits versus transistors and their circuits. One can build bad tube amps and there have been a few in history. Since my circuits, the subject of many patents, are quite different, it is not reasonable to lump them with stereotypical solid state circuits.

JI: Your amps have unusual names. Why?

EKP: First, the amps cut through the band and guitar playing can be quite aggressive. Consequently, names like Dagger, Sword, and Estoc (a long saddle sword for mounted knights). Margaux came from a wine Chateaux Margaux that has character of my amps - smooth bottom and sparkling highs. Of course the amps are sultry as well. Satori came from the mind-opening experience that I had that brought success to my research. Some time in the early 1990's I became thoroughly baffled by the lack of progress. So I checked my engineering training and experience demanding the logical precision of theoretical mathematics. There was almost none. Beyond circuit and signal analysis, there is mostly opinion and rules of thumb. This epiphany was a real satori. Now with my mind free of most engineering constraints, I could proceed. I then used engineering to keep the amp from smoking and talked to musicians, mostly Phil, for artistry.

JI: The amplifiers are quite new. Do you have patents on them?

EKP: I have seventeen U.S patents on these amps. Thirteen are on circuits, one is on the cabinet structure, and three are design patents on the appearance. Additionally, I have foreign counterparts to many of the US patents. Although, I don't have a current figure, several years ago, I had more patents that four of the five top amplifier companies combined.

JI: Where is Pritchard Amps?

EKP: We are in the rolling hills of West Virginia in that part squeezed between Northern Virginia and Maryland, about 100 miles west of Baltimore, MD. Life here has a diversity between high technology and no technology nature, primarily because there are ten acres here for every man, woman, child, and licensed dog. Although the factory is heated by propane, the house is heated by wood. So winter exercise includes sawing and splitting logs. When it snows, it becomes so quiet that you could swear you can hear the snow flakes hit the earth. On the other hand testing and demonstrating amps can be heard for a mile or more.

JI: How can you be reached?

EKP: The email is eric@pritchardamps.com and the toll-free phone is 8-SSSO-COOOL or 877-762-6665. The address is Pritchard Amps, 340 Pritchard Lane, Berkeley Springs, WV 25411♪

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